New Army Capability Will Extend the Reach of Battle Command on the Move

Timothy L. Rider

Somewhere in Iraq a division commander faces a difficult choice. An important operation is underway, and one of his brigade commanders (Bde Cdrs) implores from his area of operation — "Maybe if you could see it from my vantage point, you would understand my concerns." The division commander agrees the situation needs personal attention, but it is a bad time to leave the command post (CP) because his other Bde Cdrs are, likewise, on the move.

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He asks himself, "If I leave, will I still be able to make sound decisions regarding the next phase of the operation?" Fortunately, in today's Army, this tough choice is mitigated by a CP that rides along — the Mounted Battle Command on the Move (MBCOTM) communication system.

MBCOTM

Starting as a "side project" to meet an urgent operational needs statement (ONS) developed by U.S. Army Training and Doctrine Command Commanding General (CG) GEN William S. Wallace when he was V Corps CG in 2002, MBCOTM (frequently pronounced "em-bi-cot-um") became a program of record June 20, 2005, and is preparing for the production contract phase intended to deliver six vehicles for each modular division, said LTC Michael Ryan, MBCOTM Product Manager.

Built upon the concept of the Command and Control (C2) Vehicle that was used during *Operation Iraqi Freedom* by V Corps and the 4th Infantry Division, MBCOTM is a wholesale redesign of C2 functions

that integrates computer-based C2 applications and a mobile Ku-Band satellite antenna into the Army's current battlefield network, built around the Joint Network Node (JNN). The MBCOTM network package is a "B-Kit" that fits into a number of vehicles, including Humvees, Bradleys and Strykers.

With MBCOTM, a commander and his battle captains can keep abreast of operations by viewing a common operational picture (COP) updated automatically through the network, review plans, view various map overlays or visual representations of the battle and issue orders. Communications capabilities are conducted using line-of-sight

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(LOS) terrestrial radios and beyond-LOS (BLOS) satellite communications. BLOS communications are enabled by the JNN network, which can pass data and voice simultaneously using Voice Over Internet Protocol. A portable satellite telephone is also included.
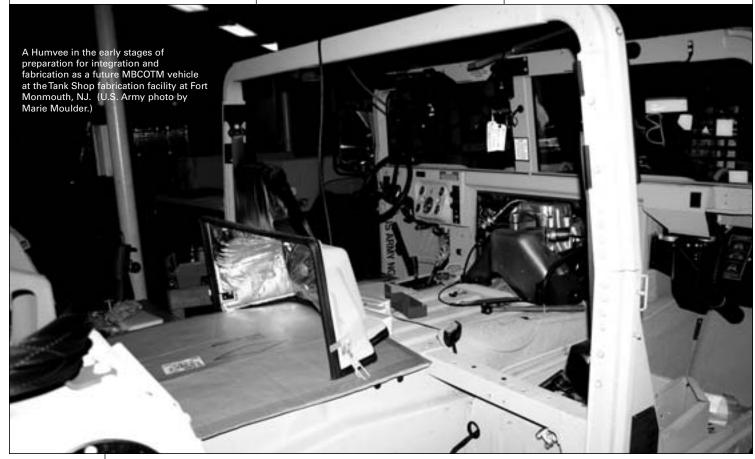
"Command is an art and a science," said Ryan. "The science behind it is basically looking at what has been done in the past, analyzing it, applying it to a current situation, then coming up with a process that enables military decision making. The art is how a guy filters through all the data available and quickly assesses what's important in terms of providing guidance to his

CERDEC's C2D Project Manager for MBCOTM, Rodney Young, performs a complete systems check of a Humvee equipped with the MBCOTM systems suite at the Tank Shop fabrication facility at Fort Monmouth. (U.S. Army photo by Marie Moulder.)

subordinates. If that data is current, relevant and there's no erroneous data, then he's going to come up with a decent battle plan and be successful."

A Humvee in the early stages of preparation for integration and fabrication as a future MBCOTM vehicle at the Tank Shop fabrication facility at Fort Monmouth, NJ. (U.S. Army photo by Marie Moulder.)

An engineer uses the CERDEC C2D Computer Automated Visualization Environment, a 3-D tool that was used to allow MBCOTM's product design to be developed in a virtual environment. (U.S. Army photo by Gregory Bower.)

"What's important to the commander while he's on the move are visualization tools tailored to his particular military decision-making process," said Ryan. "MBCOTM operates with the commander, two battle captains and a driver. When MBCOTM is operational, there is less emphasis on planning, which is handled primarily by staffs at the fixed CPs."

The development, testing, fabrication, training and sustainment packages for the system were created within the Communications-Electronics Life Cycle Management Command (CELCMC) in its formal partnership with the U.S. Army Communications-Electronics Research, Development and Engineering Center (CERDEC).

MBCOTM illustrates how building a platform with a net-centric mindset differs from traditional platform-focused development efforts. "I'm a customer on the network," explained Ryan. "The Project Manager [PM] for Battle Command builds the applications. The PM for Tactical Radio Communications Systems [TRCS] builds the network. I don't even own the platform."

That doesn't mean MBCOTM's developers didn't face platform-type developmental challenges. "The biggest issue

with the whole design was just fitting it into the Humvee," remarked Pat DeGroodt, MBCOTM's lead systems engineer and team leader of a support staff provided to CERDEC's Product Manager Space and Terrestrial Communications Directorate. Integrating network components into the vehicle and within the battlefield network is an orchestrated process. Degroodt said he worked with the Systems Engineering Integrated Product Team, a part of PM TRCS, which leads Army network configuration at echelon divisions and below.

The vehicle cannot operate successfully in a network environment until its network components are configured into the tactical network. "It involves a detailed understanding of the network within each division," Degroodt continued. Units provide their unique mission requirements, task organization and component lists. "Once you know every device on the battlefield,

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the Signal Center at Fort Gordon, GA, provides Internet Protocol space. You roll that up and you crank out configuration templates. It's a big job."

The CERDEC Command and Control Directorate (C2D) was selected as the builder to meet the ONS requirements. "We signed a memorandum of agreement with them last year and they performed exceptionally," Ryan recounted.

That directorate used a virtual reality system to integrate and fit components into the vehicle design using a computerized 3-D tool called the Computer Automated Visualization Environment. The C2D went from production design to fabrication of the first 12 vehicles at the Tank Shop facility at Fort Monmouth.

"As we transition forward, we are going out on a source selection for a systems integrator to provide a baseline material solution that will be horizontally integrated across all three MBCOTM variants," said Ryan. "CERDEC's function as a systems builder will cease after this fiscal year, but they will still be relied on for technical expertise."

CP of the Future (CPOF)

The battle command applications that reside in the vehicle will be reengineered to include the CPOF, an application that began its development in the Defense Advanced Research Projects Agency and is now being managed by the Army's CELCMC PM Battle Command.

"The CPOF can shift easily between topographic views with operational overlay — known as the COP — timeline views and data spreadsheet views of the battlefield situation, but it also features collaboration capabilities that make it a primary briefing tool for the 4th Infantry Division now in Iraq," remarked Dave Stevens, Principal Engineer for the CPOF Product Director. "Well over 500 people are hearing the commander's Battle Update Briefing across the entire division using CPOF. It creates an environment that makes it a primary tool for communication."

"Commanders want to see the data in a logical form that replicates the battlefield situation," Ryan suggested, "and CPOF's ease of use in creating combined operational overlays tailored to the commander's particular style makes it desirable. Most of the guys are used to seeing a battle that way. It's not about the technology. Warfighters don't really care about that and rightfully so. They're concerned about how data is displayed so they can make solid tactical decisions."

There remain engineering challenges integrating CPOF into the network and applications architecture, including optimizing CPOF to work with the mobile antennas and integrating operational threads from the Army's principal suite of planning, situational awareness and automated battle command applications known as Army Battle Command Systems (ABCS). "We'll conduct tests of CPOF in MBCOTM at Aberdeen Proving Ground, MD, this summer," Stevens mentioned.

"From January 2005 to January 2006 we went from concept to a material solution. We started turning wrenches last summer and we were testing in August," said Ryan. "We had to take all the brainpower from CERDEC; Program Executive Office Command, Control and Communications Tactical; and PM TRCS, and use all those people to put together a material solution in a year." The CELCMC's Logistics and Readiness Center helps Ryan to understand spares requirements and develop training packages.

"MBCOTM's story is a perfect example of what happens when you engineer networked systems," said BG Nickolas Justice, CELCMC Deputy CG for Command, Control and Communications. "By definition, a network touches everything. So many organizations within and without the CELCMC become involved that I can't list them all. From my perspective within the

> MBCOTM's story is a perfect example of what happens when you engineer networked systems. By definition, a network touches everything. From my perspective within the CELCMC, MBCOTM is a big success because we went about creating the LCMC structure here to help us more flexibly direct personnel and resources toward collaborative efforts that meet Soldier needs.
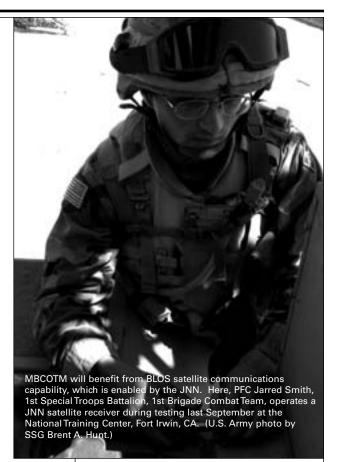
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"Everything is linked together," said Ryan. "MBCOTM extends the reach of battle command by linking into the network while on the move to receive, send and display the ABCS data necessary to make sound tactical decisions. It takes the entire CELCMC team to make MBCOTM a successful battle command enabler.

MBCOTM will benefit from BLOS satellite communications capability, which is enabled by the JNN. Here, PFC Jarred Smith, 1st Special Troops Battalion, 1st Brigade Combat Team, operates a JNN satellite receiver during testing last September at the National Training Center, Fort Irwin, CA. (U.S. Army photo by SSG Brent A. Hunt.)

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